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ABSTRACT

This master's thesis provides a description of the proposed art form called single-frame cinema, which is a category of computer imagery that takes the temporal polarities of photography and cinema and unites them into a single visual vignette of time. Following introductory comments, individual chapters discuss (1) the essential physical properties of these vignettes, which are referred to as motion-stills; (2) the conceptual properties of the motion-still; and (3) presentation of the art form. Selected works are then compared and contrasted in order to clarify points about motion-stills, and the final chapter provides a summary which includes reflections on the role of this new art form in contemporary society. Nine plates are included in the text and 10 references are listed. (MES)

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SINGLE-FRAME CINEMA

Three-Dimensional Computer-Generated Imaging

A Thesis

Presented in Partial Fulfillment of the Requirements

for the Degree Master of Arts in the

Graduate School of The Ohio State University

by

Edward Joseph Cheetham, II, B.F.A.

* * * * *

The Ohio State University

1987

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THESIS ABSTRACT

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Single-Frame Cinema: in Three-Dimensional, Computer-Generated Imaging

This thesis provides a description of the proposed art form called Single-Frame Cinema. Single-Frame Cinema is a category of computer imagery which juxtaposes motion against stillness through recursively looping minimal animation. Physical and conceptual criteria are identified which make this form of artistic expression unique from the related artforms of cinema and photography. A new form of presentation is suggested to comply with these unique aspects of this electronic form of expression. This Thesis further defines this form of expression by comparing and contrasting already existing art works with the new art form of Single-Frame Cinema.

Thomas E. Linehan
Advisor's Signature

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PREFACE

"Unfortunately, in cinema the value of the single frame has been disregarded by everyone except a small group of animators and experimentalists. Film, up to the present time, has been literal, illustrating its story and largely ignoring other contemporary forms of expression...As a result of this narrow approach, the single and solitary film frame awaits its discovery. When the realization of its importance coincides with the proper timing, a breakthrough will occur and bring about the first major revolution in the art of film. From that significant step into the future the growth will be frantic and inspiring, and filmmaking will be capable of new meaning and more powerful forms of imagery." [9]

Interview with Carmen D'Avino,
on Experimental Animation

CHAPTER 1

Introduction

As the field of computer graphics becomes more diversified, the ways in which one can experience computer generated images will also expand. Computer images are already an integral part of such fields as medical illustration, architecture, and commercial entertainment. However, the computer generated image has seriously entered the realm of the fine arts only recently. The use of the digital image is widely used in mass market media such as film, television, and/or video. As the technology and programmers' proficiency improve in exploiting these areas of mass communication, the digital image as an art form is earning respectability. This evolution of computer technology makes possible new forms of artistic expression. More attention is now being paid to the computer image as an art form in and of itself. The potential inherent in the computer art form makes possible imagery which would be inconceivable in more traditional media. Modes of expression previously unthinkable can be explored through this new digital art form.

Imitation is usually the first route in the development of a new art form. Relationships are drawn to already existing art forms to add validity to the new unexplored mode of expression. Computer imagery, as an art form, has only recently moved from this imitative stage of development and is now entering the phase in which it can exploit the computer's own unique characteristics and abilities. This study discusses one possibility for exploration of the computer's unique capabilities for artistic expression.

Emerging technologies require new references to help illuminate the previously unknown. The term Single-Frame Cinema will be used to describe the proposed area of artistic expression that lies between the still images of photography and the primarily dynamic images of cinematography.

Single-Frame Cinema, while an apparent oxymoron, is a useful term to describe the union of the separate visual elements joined in this form of artistic expression. This contradicting term reflects the juxtapositon of movement and stillness. As an art form, Single-Frame Cinema has strong affinities to photography and cinema. And while Single-Frame Cinema exhibits characteristics of both, it

does not comply with all the characteristics of either art form alone. Single-Frame Cinema takes elements of both photography and cinema, joining them into unique thought provoking combinations.

Single-Frame Cinema is a category of computer imagery focusing on the visual balance and the conceptual implications between movement and the static image through the use of minimal animation. The following is a brief outline of the essential elements united by Single-Frame Cinema. The essence of photography is the capturing of a single, static image. An obvious, though frequently unconsidered, characteristic of photography is that movement is usually implied but not demonstrated. On the other extreme, cinema is rarely static; movement is paramount to the art form.

A still image captures only an instant of time. Film captures the effects of time. Single-Frame Cinema takes the temporal polarities of photography and cinema and unites them into a single, visual vignette of time. Each individual vignette is referred to in this study as a Motion-Still. This term is used to describe each specific work within the general category of Single-Frame Cinema. The function of a Motion-Still is to remove a moment of

time from its surrounding framework through the implementation of recursive looping, thus salvaging the moment from the destructive temporal continuum.

The following three sections of this thesis will address the major criteria for Motion-Stills: visual properties, conceptual properties, and the presentation of the image.

CHAPTER 2

Essential Visual Properties of the Motion-Still

Discussing the visual properties of the Motion-Still image provides a convenient starting point. There are visual criteria that must be fulfilled to qualify an image as a Motion-Still: the overall image must remain predominantly non-moving or still; there must be minimal motion or visual displacement; and this displacement or movement must be cyclical. Each of these criteria also has conceptual implications. However, this chapter addresses the purely physical qualities of these elements.

Traditionally the term 'still' has been used to describe an entire single image: such as a movie-still (an individual frame from a motion picture), or a photograph. Even a painting can be classified as a still-life. For clarity's sake, a redefinition of the term 'Still' in a Motion-Still is needed. Very simply, the environment, excluding the moving element, will be referred to as the 'Still' element. The definition of a still image is easily understood, but its implications require clarification.

In the case of Motion-Stills, one major decision involves the determination of what is moving and what is not. It is through aesthetic decisions that the artist can manipulate the moving or static elements to create expectations or anticipations. The function of the still element is to provide an environment in which the artist can alter the viewer's predetermined ideas by adding the unexpected component of motion.

One has the ability to create a completely self-contained reality with computer animation. Nothing is predetermined for the computer artist. With the computer's capabilities, the artist does not have to contend with the restrictions imposed by the visual properties of the real world. However, these newly accessible freedoms require conscious decisions relating to every element in the scene. The most basic elements of the computer generated composition, lighting, color, placement and motion require seperate decisions. To achieve a successful Motion-Still, the artist must join together the motion and the still elements into a cohesive and aesthetic unit. The art of designing successful Motion-Stills relies on the decision relating to which element is in motion and how that motion interrelates to

the still element. Of equal importance to the composition is the effectiveness of the 'Still' which allows for the greatest potential of interaction with the motion element. The Still becomes the contextual environment for the motion, establishing the essential interdependence between the motion and the still elements.

The still element in a Motion-Still may take many forms. Abstractly, the Still may take the form of a pattern in which the movement submerges and reappears such as the changing interface between figure/ground. A recursive figure/ground relationship is demonstrated through the interlocking use of the black and white words "figure" in the illustration, "FIGURE-FIGURE" (plate 1).

The relationship can also be more graphic, as in the case of waves reflecting off the broken windows of a deserted beach house. The environment described by the house is the unmistakable still element on which the cyclic motion of the waves are reflected. The way one uses the 'Still' is determined by the concept the artist wishes to impose on the image while maintaining a balance between the motion and the still. The concept of balance/counterbalance will be discussed in more depth in a later section.

Plate 1.
"FIGURE-FIGURE", by Scott E. Kim (1975).

The importance of the 'Still' is to provide the interactive relationship for the desired motion. Without a successful still element, the motion, no matter how interesting, will not make the Motion-Still effective. The 'Still' needs a substantial amount of consideration

because it creates the reality from which the motion element derives its expressive strengths. Even though the still image have been made familiar through media such as photography, the embedding of motion into a static image requires further considerations.

The motion element in a Motion-Still provides the element of change in the composition. This motion can be integrated into the Still by utilizing two basic types of perceivable motion: apparent or actual. Motion perception, actual or apparent, is generated by a series of visible changes in the composition. Such changes can manifest themselves in a number of ways: in the shape of the object, in the color of the object, or in the changes of spatial relationships. All these changes involve some form of noticeable visible displacement [2].

Actual movement takes place when an object occupies a sequence of placements/displacements in a three-dimensional space, as in the case of a ball rolling across a tabletop. The ball occupies ever changing co-ordinates in 3-d space. Apparent motion occurs when a series of non-moving images are viewed in rapid succession. For the eye to perceive the object as moving continuously, the sequence of discrete images must be flashed at a rate

which surpasses the visual threshold between discrete and continuous motion. For a Motion-Still, the desired rate should comply with video standards of thirty frames per second. At this rate of display, the eye is incapable of distinguishing discrete images and the brain will complete or "fill in" the motion through the process known as the persistence of vision [2].

Animation is the best example of this type of apparent motion. In reality there is no actual movement in animation. Animation is based on a series of discreet static images viewed at the proper rate of speed which the viewer will automatically interpret as motion. Motion-Stills, like traditional animation, are two-dimensional representations of three-dimensional space; therefore, visual displacement can only be represented through apparent motion. The ways in which Motion-Stills can manipulate visible displacement becomes the key for the creation of a successful motion element.

Different levels of visual displacement can be interpreted as the motion element. The motion can be either subtle or dramatic. The movement can be indicated as an object moving through space or the use of color manipulation of the object. Regardless of which form the

motion element assumes, it is of great importance that the motion does not overpower the still element of the composition. Specific examples of different levels of motion are described in the following to illustrate this point.

A technique often used in computer animation, is the movement of the observer's field of view or eyepoint to suggest that the viewer is moving or flying over the composition. It should be obvious, that moving the eyepoint cannot be used in a Motion-Still. Principally, it is due to the fact that it would incorporate too much movement and consequently destroy the essential still element. Such an animation technique would be comparable to the visual effect in a flight simulator. However; the concept of eyepoint movment should not be discounted entirely, if a static frame of reference is present for the eye to creates the overall still element. For example, the illusion of the viewer flying over a landscape would not be permissible. On the other hand, if the image of the passing fields is seen as a reflection off of the pilot's glasses (creating a primary still frame) the image could be a valid Motion-Still. In both cases, the conceptual eyepoint can be viewed as moving,

but in latter case, a static frame of reference is used as the still element providing contrast with the motion.

The use of the stationary eyepoint means the element of motion can only occur within the area defined by the scene. Since the counterbalance remains the major concern, even this defined area of activity cannot be too large or the contrast between the still and the motion is lost. This essential contrast between motion and stillness is what makes the art form of Motion-Stills unique. Too much movement dilutes the static element and removes the image from the realm of Single-Frame Cinema, and places it in the realm of animation.

With these considerations in mind, the motion component of a Motion-Still should be limited to a single element of the composition. Variety of motion must be avoided. Even when the motion element has been selected, its movement within the entire image must be given careful consideration. It is the motion element that gives direction to the static element. The use of more than one motion would diffuse the direction of the piece. The intelligent use of the single motion element will draw special attention to the overall composition. As interesting as the motion can be, it must be kept in mind

that it is only one element of the composition and, as such, is subservient to the image as a whole. Motion-Stills use the principle of highlighting the movement by placing it in a completely static environment. Everything is unchanging save for the singular motion. Using a single moving element is the best way for a Motion-Still to exemplify movement. It focuses the attention of the viewer on the dynamics of the paradox generated by the juxtaposition of motion and the still. This ability to accentuate movement distinguishes a Motion-Still from the photographic image.

A Motion-Still is not limited to the expression of its movement by the use of a single object. At times, this is not sufficient to capture the right feeling the artist desires for the image. A number of individual elements may be used for effect if, any only if, the elements so used move as a single object or group. For example, the moving shadows of flying birds falling over the face of a frightened young girl can be viewed as singular motion. It is the birds as a singular object which frightens the girl. Individual birds are usually not threatening but when moving as a large single group they can be ominous.

Another illustration of this point utilizes a pair of drapes. The drapes, although two different pieces of cloth, can be viewed as one distinct unit which surrounds the window forming a single moving element. Another example of unity composed of diverse elements might be that of water dripping from a spigot. One motion is the individual drop of the droplet of water and the other motion is the splash as it hits the surface. These are two distinctive motions but conceptually they can be viewed as one movement. The falling drop initiates the motion and the splash upon impact closes the motion.

Visual displacement not only occurs in space, but it can also be a change in the appearance of an object. Imagine a kitchen scene with a drinking glass resting on a table. If the glass transforms from its transparent state to one of stone, has any movement taken place? True, the glass has not altered its position in space, yet there has been some visual displacement which has informed the viewer that the material of the glass has changed. Such changes therefore, can be used as the motion element in the creation of a Motion-Still. An unexpected change in the legitimate appearance of an object can be as powerful as motion in space, yet, it allows for subtleties not

available by mere motion through space. There are various elements that can be manipulated to convey this type of motion. Color, transparency, and texture are the most likely elements for manipulation.

Color is one of the most obvious visual elements. Much information is conveyed through the use of color. The viewer's perception of the object can be changed by altering the color of that object. An extended hand normally is a welcome sign, but if the hand is colored a pale blue, the meaning may change from one of welcome to one of threat.

There are other variables that can manipulated to convey a concept. The shininess of an object implies a smooth polished surface and the transition between the glossy look of an object to a flat look might be used to express an idea. As stated above, subtle visual changes are legitimate elements of motion in an image. The computer allows for the capability to play with ideas and their conceptual settings in a way that was previously impossible. For example, transparent wood or translucent metal are types of images which are not readily visualized without the help of the computer. In a moment of time, the computer can transform shiny metal into a dull ingot

by the manipulating the specular highlights of the metal. Reflected images can also be manipulated. The transformation of an image in an object's reflection can be a subtle yet powerful motion element.

Another unique aspect of the computer's potential for creativity is the ability to superimpose a textured surface on to an object. The illusion of adding texture to an object is referred to as 'texture mapping'. Texture mapping a surface (or even another image onto an object) has become somewhat common place in computer graphics. But what is important to note here is the expressive qualities that an artist can give to an image through this texture mapped transition. The transition, whether through color, transparency, or texture, is a valid motion element. This type of motion can be powerful enough not to be lost in the still element of the Motion-Still as long as the transition makes a statement about it's surroundings, itself, or the artist's purpose. These visual variations of motion, though subtle, can be made substantial, potent, and thought provoking.

Choosing the appropriate type of movement, and the manner in which the motion is presented, requires much consideration. One goal of a Motion-Still is to

perpetuate the illusion of endless time. If the motion ends, the image becomes an example of photography. There must be some interest generating cycle of motion which places the image not in the past, but in the ever-present. A Motion-Still is a captured moment of unending time.

> Time is believed to be continuous without interruption and to have no gaps. It is further considered to be "infinite," endless on both sides... [5]

Motion-Stills can recreate Heigegger's observation by using a motion that does not have an obvious beginning nor ending. By using a motion that can be blended into itself again and again. Such an image does not to come to an end. This type of ongoing motion is called cyclic motion which can be easily implemented by the use of a recursive loop. Cyclic motion can repeat itself without an apparent break in its continuity. Motion-Stills can utilize various types of cyclic motion. Two categories of cyclic motion are: event oriented, and non-event-oriented. These cycles can be sub-divided into patterned and random motions.

These cycles and their variations require a more in depth analysis. Event-oriented motion is that motion

which consists of subunits having a definite starting point and a definite ending point. Consider again the image of water dripping from a faucet. The slight bulging of water around the lip of the spigot signifies the beginning of the drip. As water accumulates, gravity causes it to fall. The splatter of the drop as it hits the surface is the end of the event. When this movement is cycled continuously, the beginning of each drip is the start of a new cycle but not the start of a new animation. Conceptually the drops are not seen as individual animations, they are viewed as one overall continuous motion.

One division of event-oriented motion is that of patterned movement. Again, the water drops are an example of this type of motion. The dripping motion creates a visual recognizable cycle. The event-orientation refers to the distinct happening or event, as is case of the formation of the droplet at the spigot's lip. This event is responsible for the perpetuation of the patterned motion. There can be some time variance between each drip to create visual interest, but the motion relies on the event orientation factor and the pattern is not altered in any significant way by variations in time.

Another division of event-oriented motion does not depend on a predetermined pattern but is randomly fashioned. Envision tree branches swaying in the wind. The branches move with each gust of wind. Each gust represents an event and the way the branches react to the wind will be different each time the wind blows. It will, in effect, be random. Each event is met with a random response, rather than a predictable motion. The event oriented motion deals with the realm of interaction, either seen or unseen, which exists between two objects or forces. This motion plays upon logical reactions to a given stimuli and is not as abstract as is the next type of cyclic motion; non-event-oriented motion.

Non-event-oriented motion does not require a reason or an event to precipitate the motion. Non-event-oriented motion does not have narrative implications which event-oriented motion may suggest. The altering of an object's characteristics, such as transparency or color, could fall easily into this category of non-event-oriented. Any type of motion that does not reflect a cause/effect relationship within the context of the image is considered non-event-oriented motion.

The simplest form of motion is a patterned, non-event-oriented motion. This type of motion is similar to the action of spinning gears. The motion of the cogs rotating can be cycled through and through without ever establishing a starting point or ending point. The rotating cogs themselves create the cycle. Only one complete rotation of the cogs needs to be programmed, then the entire Motion-Still is continuously looped. This patterned motion is not event-oriented because there is no impetus to constantly renew it's activity.

Unlike patterned motion in which the movement follows a predetermined form, random movement is inherently capable of more variation. There is no framework for the motion, so there are no expectations for the motion to fulfill. A Motion-Still consisting of a variety of partially filled bottles might utilize random non-event-oriented motion by having the level of the liquid fluctuating randomly to create different patterns. Manipulating the color of these different liquids could result in beautiful layers or mixtures of hues. Neither type of change or motion has a particular reason for occurring. The liquids are not altered by an event in the Motion-Still and the changes are not predetermined. This

random quality can be playful or mysterious, but in either case it is completely unpredictable.

An artist may desire to create a Motion-Still that interacts with its environment. For such a work a predetermined pattern or motion may not be sufficient to express this concept of interactiveness. A framework of motion can be established in the Motion-Still, leaving a variable open that would determine the actual pattern or appearance of the piece. These variables could include such elements of its environment as sound or temperature. In a visual example, the rate of the condensation on a glass correlates directly with the 'real world' temperature. Another variable that may affect a Motion-Still could be related to a person's voice; the deeper the voice, the darker the object's color. Such a Motion-Still has not been produced, but it is important for the artist to realize that these possibilities exist and are available when creating with this technological art form.

Motion-Stills, although new as an art, deal with traditional aesthetic concerns and principles. Artists, up to this point, have been concerned with a myriad of variables such as the effects of color, overall composition, and balance. But now they are able to deal

with the element of motion and its effects. Motion-Stills are dynamic. Each change the artist uses must be evaluated with concern for the successfulness of the image. A still image, beautifully composed, can be destroyed by the introduction of motion. One must learn to design with motion. Motion itself has infinite variations. The simple motion of a bouncing ball has unlimited variables. For example, the substance of the ball; the type of the ball (basketball, bowling ball, marble); the elasticity of the ball, are but a few. Each ball has its own type of bounce, its own type of motion. The motion can communicate information concerning the material of the ball, the speed at which the ball travels, its weight, even the type of surface on which it is bouncing. This is a simple example, but artists need to understand the subtle varieties of motion inherent in even the simplest of movements. This understanding and control is extremely important in Motion-Stills because the image focuses on that one single element in motion and its relationship with the rest of the image.

Because so much attention will be drawn to the single moving element, the artist must utilize this focus very expressively. As in a game in which the player can say

only one word to communicate a sentence, economy is of the essence. The voice inflections, the length and pitch of each syllable and the emphasis of particular sounds, all infer some meaning and thus enriches communication. Motion can also contain these subtle expressive qualities to enliven the exact communication of the desired concept.

The essential interdependence of the motion element and the still element cannot be overly stressed. The dynamics of the motion should always be viewed within the context of a successful relationship with the Still. This chapter has covered only a small fraction of the different possible expressions which motion can convey. With Motion-Stills, an artist can play with the visual designs of cyclic motion and rhythm as a composer plays with the rhythmic qualities of music. The use of rhythm is an especially expressive tool for the artist because there are many psychological implications surrounding visual patternings.

Rhythm is another structural element to be considered when developing an effective Motion-Still. As Kreitler & Kreitler suggest in their book, Psychology of the Arts, rhythm is imposed on or discovered by the viewer as an organizational principle [7]. In order to use

rhythm the artist needs to understand how rhythm works.

> Rhythm constitutes a certain ordering or patterning, usually of time, based on cycles of appearance of something and its recurrence after a certain temporal interval. Three elements are central in this suggested definition: periodicity of occurrence, temporal intervals, and patterning...these intervals are as crucial for the perception and formation of rhythm...If intervals are too short, the recurrences fuse into a continuity, while if they are too long, the recurrences are grasped as independent nonrhythmic events [7].

Artists deal with the element of time in the art form of Motion-Stills when they consider the length of occurrence/non-occurrence and the intervals between them. It is only in this instance that the passing of time plays a part in a Motion-Still, since, by definition, a Motion-Still is timeless. It would be an error to consider the period of non-occurence as dead time for it is this pause which constitutes an equally vital part of the rhythmic scheme.

This rhythmic concern is more evident in the well defined, event-oriented motion cycle. But rhythmic awareness is just as important when using non-event-oriented motion. Since non-event motion does not have an established beginning or end, the occurrence factor is not

readily perceptible. Accentuated movement may proxy for the element of occurrence in a Motion-Still, while passive movement can take the place of non-occurrence. Artists must question the motion very literally. What kind of motion can be used to create an interesting pattern? How is it possible to create a threatening rhythm, or a calming rhythm? What can be done to make an uninteresting rhythm more dynamic? Can overlapping patterns give the Motion-Still more of the desired feel? Can using slight variances of the pattern make the rhythm more interesting? Is the location of the motion appropriate for the rhythm itself? These types of questions must be considered when trying to incorporate the element of rhythm in a Motion-Still.

Aesthetically, any type of variation can be successful depending on the concept and execution of the motion. But there are limiting conditions to the the successful use of rhythms. Too slow a rhythm or too subtle a change destroys the balance between motion and still of the composition. There needs to be a perceptible change during the viewing time to communicate that this is more than just a still image. On the other hand, with a rhythm that is too enveloping the Motion-Still becomes

more akin to animation. For a successful Motion-Still there needs to be something that intrigues the viewer, causing them to look deeper into the image, to look for answers and reasons concerning the nature of the motion and it's meaning.

It is easy to tell if a given work has balance, but defining what it is that makes a composition balanced will vary from critic to critic. For a Motion-Still, the aspect of balance under primary consideration is the relationship between the movement and the Still (i.e. the relationship between active/passive, action/inaction, motion/stillness). The tying together of these variables into a cohesive whole is the result of balance. When deciding if a Motion-Still has balance, one must ask all-encompassing questions concerning the image. Is the stillness overpowering the movement, thus making the movement insignificant? Is the movement be too strong or does the movement envelope the image so there is little or no room for the stillness? Is the relationship between the elements so equal that they make an unexciting or boring motion still?

Some of these questions on balance can be easily answered. For example, By definition, the majority of the

Motion-Still image is non-moving, so the image cannot contain motion that overshadows the stillness aspect. Since there is a tendency to over emphasize motion, this concept of over powering the still element must be given a concrete example so that this error can be recognized and avoided. Take the image of a person rocking back and forth in a rocking chair. The visual emphasis is on the motion of the person rocking. The surrounding room maybe still but this element has more of a supporting role rather than an equal role. The rocking motion does not question any relationships. It merely imitates reality. The emphasis is directed on a commonplace motion, not with the motion interacting with the Still. It is the art of animation that allows one to focus predominantly on motion, but a Motion-Still does not emphasize only the motion, it emphasizes the relationship between stillness and motion. This use of the cyclic rocking motion provides an example which is appropriate when considering the type of motion acceptable for Motion-Stills. Incorporating only this one characteristic does not satisfy all the requirements for a successful Motion-Still.

One manner of integrating a person rocking into a Motion-Still would be to place a mirror in the room. Then, if the person were seated in such a fashion that the viewer could see only part of the person in the chair, but the majority of the image was only a reflection, then the pre-conceived expectations of physical relationships could be played upon in the image. When the viewer sees the person rocking an expectation is established for the reflected image to act in concert. But, what if the reflection remains motionless? The emphasis has suddenly shifted to the still image in the mirror, not the motion. The overt movement becomes the accent which makes us wonder why the reflection is static. The viewer would seek to resolve such an apparent paradox. Is the image in the mirror the reflection of the person in the chair or of another person? Is the reflection truly a mirror? The direction shifts completely from looking at the movement to questioning the relationships of the movement to the rest of the composition. This is the true essence and aesthetic appeal of a Motion-Still.

At the opposite extreme, if the image of the person in the foreground becomes unrecognizable as the form in the mirror, the movement becomes meaningless. It does not

lead the viewer into the conceptual paradox. The viewer does not question the concept but simply wonders what is moving. In this case the motion does not accentuate anything, it is merely arbitrary. If the motion does not relate to the rest of the image, the concept of the piece will be ignored. An insignificant or weak motion does not have the ability to hold interest. If this is the case, the motion will not be viewed as a significant element and therefore will not have the potential to evoke questions concerning its relationship to the rest of the image. The artist must bring out the element of motion to play a more integral part in the image. The resulting image is a manifestation of a particular concept. The image and it's concept are inseparable.

CHAPTER 3

The Conceptual Properties of the Motion-Still

Up to now, the visual properties of Motion-Stills have been addressed. Some factors under discussion have been the use of the static image as a framework; the use of visual displacement as a valid motion element; the use of various forms of cyclic motion; the visual use of rhythms; and the counterbalance of motion and stillness. All these topics deal with the physical appearance of the Motion-Still image. But there are other properties that are not this visually concrete but are of equal importance. These properties are in the realm of conceptualization. The conceptual properties are another facet which allow us to distinguish a Motion-Still from more traditional types of imagery. The following is an introduction to the conceptual properties of Motion-Stills.

An artist such a Magritte exemplified the importance of conceptualization in art. Magritte was a master of expressing concepts in clear and often unsettling ways. His paintings, though physically and technically

beautiful, derive their potency from the conceptual realm. For Magritte, a painting without a concept was like a mind without thought. The thought ruled supreme. It was as if the body of the paintings existed solely for the expression of his concepts.

> He (Magritte) particularly liked to refuse the name of artist, saying that he was a man who 'thought', and who communicated his thought by means of painting... [4]

When recalling a painting by Magritte, one does not immediately think of the brushstroke technique, or the brilliant use of color. What comes to mind is the juxtaposition of images Magritte used which forced the viewer to re-evaluate long held yet seldom considered beliefs. The viewer is provoked to think, not merely look. Magritte establishes a basis of expectation and then breaks it with an element of the non-sensical.

> Magritte never dealt with single, static identities. His images incorporate a dialectical process, based on paradox, which corresponds to the unstable, and therefore undefinable, nature of the universe. Thesis and antithesis are selected in such a way as to produce a synthesis which involves a contradiction and actively suggest the paradoxical matrix from which all experience springs. The fundamental dynamism of Magritte's images depends on an exploration of the free field of possibilities, or potentialities, which lies outside the range of what are usually considered

'normal' situations [4].

An example of this 'field of possibilities' is found in Magritte's work entitled, "The Field-glass" (plate 2).

The image is quite paradoxical. The left panel of the window in the painting shows what could be a normal skyscape as seen through a pane of glass...or is a skyscape painted on the pane of glass...or could the view be a reflection of the sky? The options are all legitimate possibilities if one only looks at the left pane of glass. The right pane of glass; however, dismisses all these possibilities. The panel is open showing the black void that is really behind the window...or is there a black drape outside the opened window? Other elements do not resolve the paradox. The clouds are not in perspective with the angle of the opened glass, therefore it seems safe to conclude that the sky is not painted on the windows. In the upper portion of the right window we can see the window frame through the glass, indicating that the windows are transparent. But how can one see through a window but not see what is on the other side of it? Finally, one realizes that an exact interpretation of this painting is not important. What is important is that

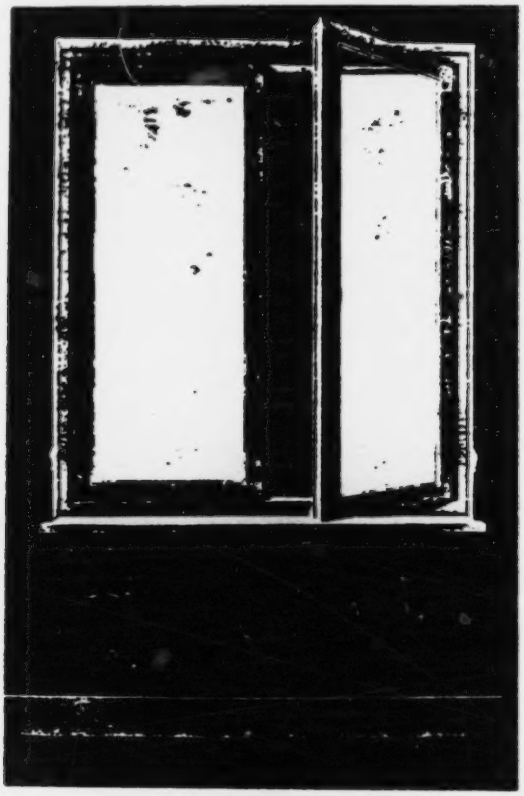

Plate 2.
"The Field-glass", by Rene Magritte (1963).

Magritte has created an image that requires the viewer to delve deeper into unspoken concepts of reality re-evaluating preconceived ideas, thus allowing for a higher

realm of expression.

Imagine the wider 'field of possibilities' that Magritte could have explored by incorporating motion in his images. How could the element of motion be used to enhance his painting "The Field-glass"? Consider the prospect of the windows being fully shut, suggesting a normal view through a window. Once the premise has been established he can now manipulate the elements away from the preconceived notions of reality. Consider the implications if through the force of the wind outside, the pane starts to open, revealing the void behind. The pane of glass, manipulated by the wind, swings back and forth. We can see the frame work of the window through the glass, revealing the transparent nature of the glass. After an interval the window shuts again; establishing the basis for the cyclic element of motion. The inclusion of motion adds another dimension to the concept Magritte established. And in developing this simple cycle into Magritte's painting another level of paradox is revealed. Where did the wind come from which opened the window? Did it come from the environment outside? The image beyond the open window established that there was no environment outside.

Another treatment that Magritte might have chosen, had he utilized the art form of Single-Frame Cinema, could have been making the clouds move within the window pane. This realistic movement of the clouds would strengthen the illusion of reality, while the black void simultaneously negated it. These are some of the possibilities, and undoubtedly a genius like Magritte would have envisioned many more.

Another master of the paradoxical image is M. C. Escher.

> Escher was the creator of some of the most intellectually stimulating drawings of all time. Many of them have their origin in paradox, illusion, or double-meaning...there is often an underlying idea, realized in artistic form. And in particular, the Strange Loop is one of the most recurrent themes in Escher's work [6].

As seen in the composition (plate 3), the carfully constructed details of the monastary beguiles the eye into accepting the reality presented without question. After one examines the composition more closley, the viewer realizes that the continually rising stairwell on which the monks march joins itself on the level at which it began. The abundant detailing provides a believable frame of reference establishing the expectations that are

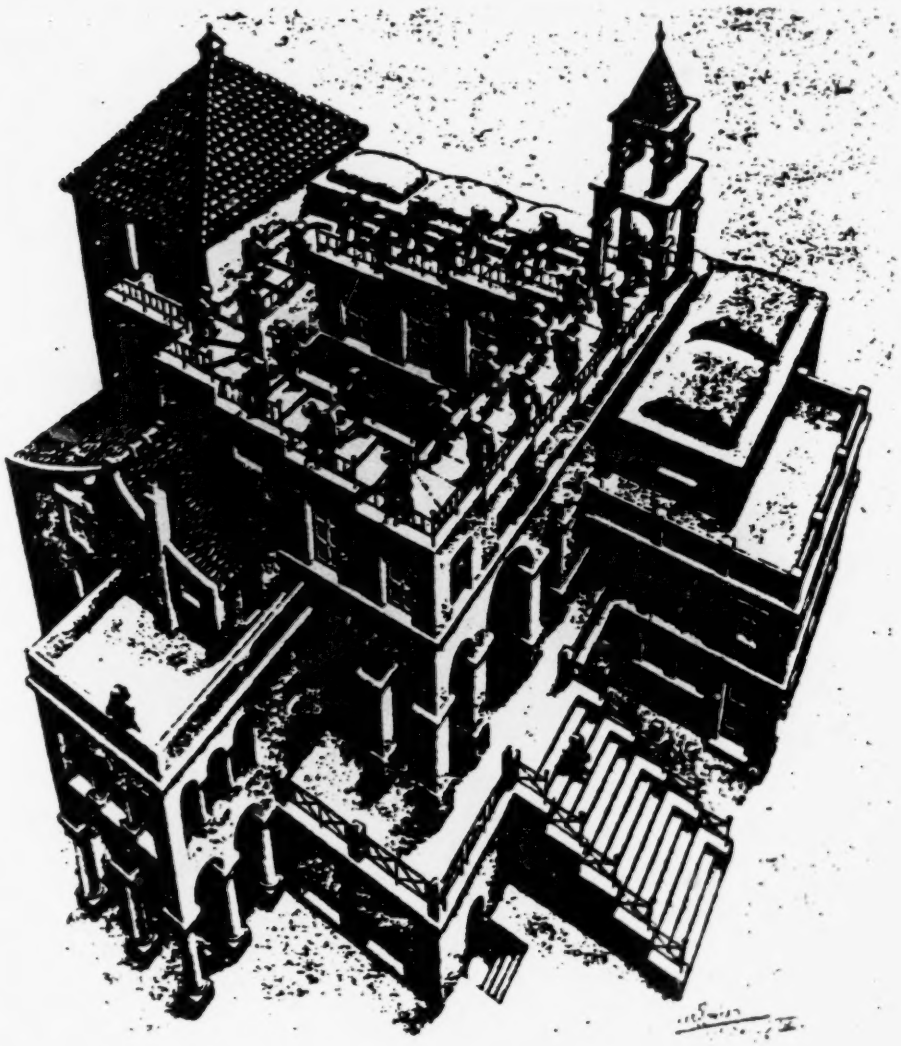

Plate 3.
"Ascending and Descending", by M. C. Escher (1960).

shattered by the presence of the strangely looping stairwell. The image appears real but in reality it cannot exist. The creation of a cyclic stairwell provides Escher the opportunity to play with elements both visual and conceptual. Visually, the stairwell accomplishes the physically impossible. Conceputally, the stairwell may imply man's lack of individuality or man's unwillingness to question authority, or more generally the futility of life.

The use of a strange loop as utilized in "Ascending and Descending" provides the element of an on-going cycle that exemplifies the concept of the endless moment essential to the art form of Single-Frame Cinema. As Hofstadter observes:

> Implicit in the concept of the Strange Loop is the concept of infinity, since what else is a loop but a way of representing an endless process in a finite way [6].

Using Magritte and Escher as examples, hopefully establishes the type of concern an artist must have with the conceptual properties when creating a Motion-Still. Although Magritte and Escher dealt with still images, their ingenious insights into seemingly contradictory

relationships can successfully translate into a dynamic Motion-Still.

> Insight is a form of gestalt, involving the sudden active perception of new relationships. It is structured by the union of a mental and a visual perception, which underlies the best of Magritte's images [4].

Motion-Stills deal with the balance and relationship between the actualized image and its conceptual framework. In Motion-Stills, the stillness and motion are counterbalanced in such a way that the resulting image exhibits the distinctive parental traits inherited from photography and film. However, one 'side of the family' does not predominate. The 'child' of this union is more than the mere sum of its parts.

In a narrative sense, Motion-Stills have more in common with photography than cinema. A film, in traditional terms, is a story-telling form of communication. The film's plot takes the viewer through a variety of experiences (dialogue or images) which serves to communicate the idea or story. The director of the film controls what the viewer is watching, thinking, and even feeling. This is done by carefully showing the viewer particular instances, drawing the viewer to form

certain desired opinions.

> Narrative content takes the form of an unfolding plot or of a gradually emergent representation of an idea. This is notably in the case of film...The situation is different for music and the visual arts, which do not present plots in the usual sense of the word...the portrayal of a temporally unfolding plot in a picture or a piece of sculpture must be highly concentrated and reduced to one representative instant, rarely more [7].

A photograph does not have a temporally unfolding plot. The image is only one representative instant suggestive of a plot. The viewer does not have the guidance of a director for an interpretation that is provided by the film medium. One must take on an individual effort to form opinions or draw conclusions.

> The intensity of the tension evoked depends not only on the dramatic nature of the represented scene, figure, or plot but also on the force with which the images suggest to the spectator the questions, How will the scene end? and What happened before?, and on the strength of the tendency of closure for the gestalt of the plot [7].

Motion-Stills have the intrinsic ability to explore the realm of non-narrative kinetic imagery. Some of life's most interesting phenomena cannot be captured in an instant, yet such phenomena are not story dependent.

There is no need to rationalize all phenomena by placing it in a narratively contextual format. The graceful beauty of wind blown drapes is one example in which the viewer may only want to enjoy the delicate motion rather to search for additional meanings. Photography cannot actually demonstrate movement, and cinema would typically disregard such occurrences as too trivial for the justification of a film, leaving a vast range of imagery to be exploited through the expression of Motion-Stills.

Even through Motion-Stills should not attempt film-like narration, they have the ability to infer a storyline. As with photography, painting or sculpture, Motion-Stills (if they infer narration) must reduce the plot into a highly concentrated representation. This final representation will infer the storyline leading up to the pictorial climax. This type of inferred plot may be illustrated through a set of circumstances. For example, consider the premise of a husband's infidelity. He often sees a younger mistress, who up to this point in the relationship doesn't know the man is married. Then the truth comes out. How could one infer this pseudo plot into a Motion-Still format. The environment could be that of the young lady's apartment. The camera angle is at

floor level. A pair of man's shoes are placed carefully under the bed. The woman's shoes are more casually tossed next to them. The framing is a very tight shot on a woman's hand raising the bedspread revealing the man's wedding ring wobbling on the floor.

This tableau is not a plot, rather a set of circumstances. The climax of the story is inferred through the single continuous wobbling motion of the ring. Motion-Stills do not easily indulge in story telling because only one moment of the story can be captured.

As with narration, a purely narrative motion should also be avoided. In the above example, if the ring repeatedly dropped into the screen space and then wobbled to a stop, the sense of a beginning and ending would be stronger than the timeless motion of the ring spinning. This would not be an effective Motion-Still but a very short animation.

Another example of narrative motion is a door opening then closing. There is logical beginning, middle, and end to the motion. This type of movement could be easily filmed at any busy office building. Instead, for the use of this image in a Motion-Still, consider the image of an

open door being pushed back and forth by the wind. This motion need not lend itself to narrative development. In this case there is not an established beginning nor is there a definite end. It still contains the basic movement of a door in motion, but the feel if the piece is totally different. If the door shuts completely, then the viewer becomes more aware of the flow of time between the opening and shutting, rather than the meaning of the movement itself. The wind-blown door could be interpreted as someone's indecision, or uncertainty in choice. This type of movement leaves room for many interpretations, prompting the viewer to ask questions of himself and the image.

One characteristic that distinguishes these types of images from others has yet to be discussed. As in the way that Magritte 'puts the real world on trial', Motion-Stills must also "...question the stereotypical habits of the mind, since only a willful disruption of the usual certainties will liberate thought and open the way to authentic revelation" [4]. One can manipulate preconceived ideas utilizing conceptual conflicts.

The conflict of symbolic incompatibilities is referred to as conceptual conflicts [1]. By playing upon

systematic beliefs one can create an image that is conceptually conflicting. The viewer is then asked to deal with unfamiliar and possibly threatening ideas and feelings. Images that do not conform to our ordinary way of thinking tend to inspire antagonistic emotions. These antagonistic feelings may be innate or learned.

> Most conceptual conflict will, however, fall clearly into the learned antagonism class. Training in the use of language, in the facts of external nature, and in the techniques of thinking will have made the subject averse to, or incapable of, fusing certain elements into one symbolic unit [1].

There are distinguishable forms of conceptual conflicts: doubt, perplexity, contradiction, conceptual, incongruity, irrelevance, and confusion. The following definitions are taken from Berlyne as found in Conflict, Arousal and Curiosity. The differentiation of these varieties of conflict are subtle. To help clarify each type of conflict, an example will be given.

> Doubt- there is, first of all, the conflict between tendencies to believe and to disbelieve the same statement. Doubt will presumably create maximum conflict when the tendencies to believe and to disbelieve are equal in strength.

Doubt usually occurs when one looks at photos taken of unidentified objects. One is skeptical to believe it's authenticity and questions the various aspects of the photograph. Is the object is home-made? Has the photo been retouched? Is the photo some sort of natural phenomena? In this case there is some indecision as to whether it should be believed or not. The inconclusive nature of this type of image exemplifies the conflict of doubt.

> Perplexity- when there are factors inclining the subject toward each of a number of mutually exclusive beliefs, e.g., when there is some evidence favoring each of them but no way of knowing for certain which is true...

Magritte's "The Field-glass" (plate 2), is a perfect example of perplexity. Each window pane has its' own visual logic. Placing the two panes together in one window, nullifies the belief pattern created by the other. The viewer is perplexed when trying to decide which window is true.

> Contradiction- a state with a probability of zero and bearing an infinite amount of information.

I will use another example from the conceptualist Magritte. "The Labours of Alexander" (plate 4), is total contradiction. The image suggests the ax used on this newly cut tree, is to be found under same trees' roots. It is an impossibility; a contradiction of time to

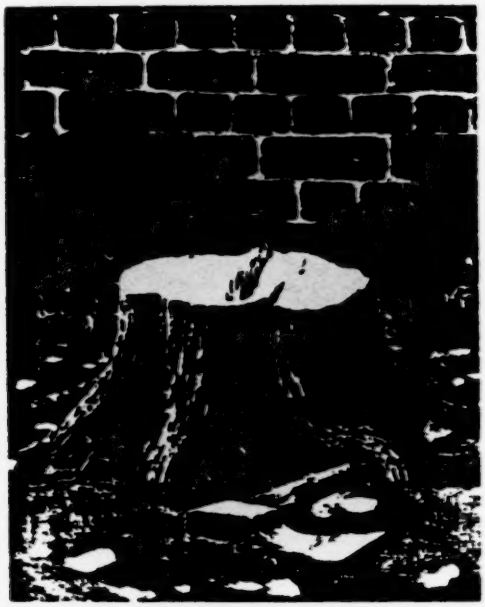

Plate 4.
"The Labours of Alexander", by Rene Magritte (1967).

perceive the ax as the actor who chopped down the tree.

> Conceptual incongruity- occurs when a subject has learned to believe that property A is unlikely to be found together with property B, and yet sources of knowledge indicate that a certain object or event has both A and B.

Many of Magritte's paintings use conceptual incongruity. "The Battle of the Argonne" (plate 5), takes the property of weightlessness and combines it with an image of a rock. We have learned from past experiences that rocks are heavy. Magritte destroys our pre-conceived notions about the weight of rocks by having them float serenely over the landscape. This image has the physical appearance of a rock but it also has properties of a cloud.

> Confusion- Stimulus patterns that are ambiguous or can be confused with one another may give rise to conflicting symbolic responses in much the same way as they arouse conflicting identifying or overt responses. When we first see a hybrid animal like the tigon, the stimulus pattern is sufficiently similar to those produced by a lion and a tiger to evoke responses corresponding to both and yet not so much nearer the one than the other that one set of responses will predominate.

An example of a confusion is demonstrated by the Strange Loop used by Esche. in his lithograph entitled,

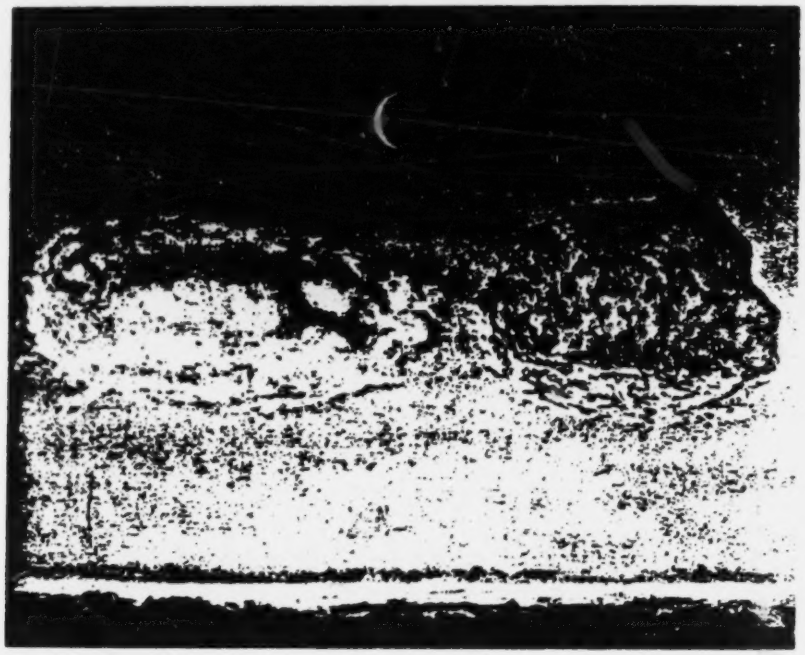

Plate 5.
"The Battle of the Argonne", by Rene Magritte (1959).

"Drawing Hands" (plate 6). The confusion is generated by the "Tangled Hierarchy" of a three-dimensional right hand drawing a two-dimensional left hand that becomes a three-dimensional left hand drawing a two-dimensional right hand, which becomes a three dimensional right hand drawing... [6]

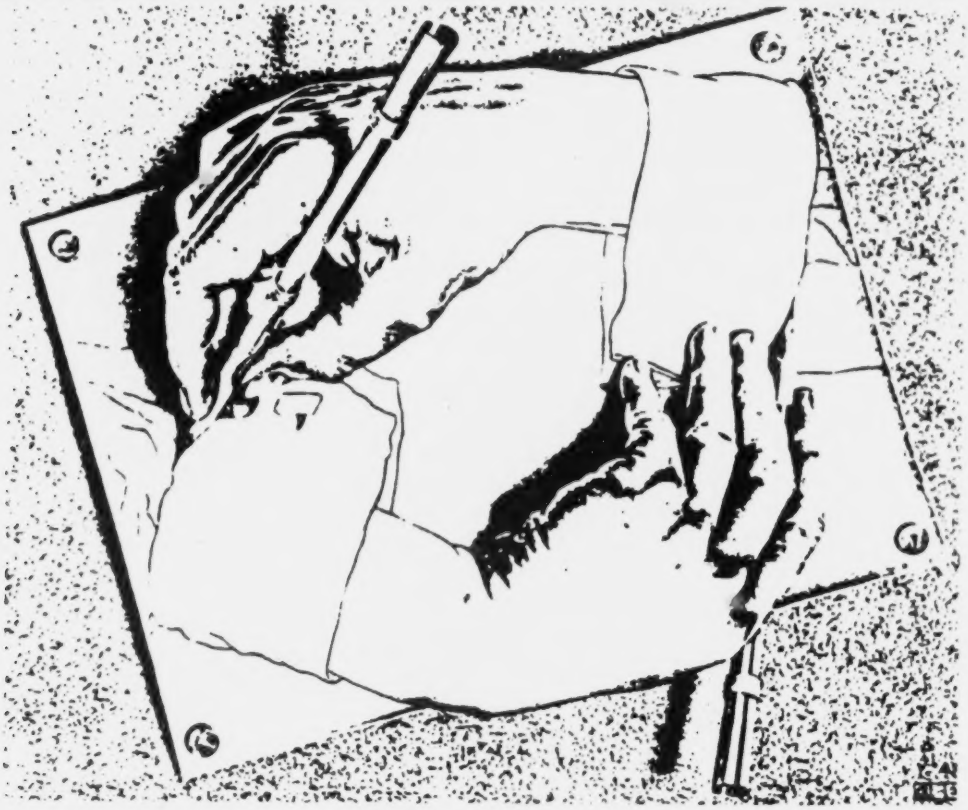

Plate 6.
"Drawing Hands", by M. C. Escher (1948).

Irrelevance- thoughts correspond to signals that are statistically independent of important events and consequently bear no information about them, leaving high uncertainty undiminished.

Probably one of the most famous of Magritte's work falls into the category of irrelevance. In the image, "The Postcard" (plate 7). an apple appears over the

Plate 7.
"The Postcard", by Rene Magritte (1960).

figure of a man viewing a mountain-scape. The apple element is seemingly independent of the figure. The apple's relationship to the rest of the image is uncertain. The relevance of the apple in the landscape is in question. The viewer must look at their own dogmatic views of the world and it's possibilities.

Each type of conceptual conflict, in it's own way, forces the viewer to look at life from an unaccustomed angle. Traditional viewpoints do not enlighten or inform the viewer. Nontraditional viewpoints allow for growth and insight. Through conceptual conflicts expectations are broken allowing for possibilities. Using conceptual conflicts, as an element in a Motion-Still, one must merge the inherently conflicting elements of motion and stillness to bring about new visions of the world.

In terms of Composition, the majority of the Motion-Still image is static. This permits the artist to create and form the viewer's expectations. One may see the still as reinforcing traditional viewpoints and thus establishing expectations.

For example, a still element may consist of a realistic forest scene. If all the visual clues are

consistent, reaffirming preconceived ideas, the viewer's belief system is not challenged. The artist has created a stage to which the viewer can relate willingly and comfortably. Only after the artist has reinforced the expectations of the viewer, can a change of direction be unexpected.

> Evidently, observers use the normal relations among objects to speed perception of a scene and it's components. This conclusion is supported by another of Biederman's studies (Biederman, 1981). When the natural relations among objects are violated, rather than simply scrambled, observers have difficulty detecting the violation in brief presentations (Biederman, Mezzanotte, and Rabinowitz, 1982). But once the violations have been detected, people spend more time examining those unexpected parts of the scene, as a study by Geoffery Loftus and Norman Mackworth (1978) revealed [10].

By showing the viewer a realistic image of a forest, there are no new insights to be shared. The obvious is more or less reiterated. Imagine the anxiety provoked in the viewer when the addition of motion destroys the whole believability of this comfortable image; as when the entire forest starts to pulsate as if breathing. What was once safe and placid is now threatening and uncomfortable. The viewer must now deal with an unexpected range of emotions. The viewer's preconceived notion are ruptured

due to this unexpected event. The viewer starts to re-evaluate all that is seen. Familiar things take on a whole new meaning. Everything has changed, nothing is taken for granted. The viewer is aware of every second, every movement, every element. The feelings experienced by the viewer are much deeper and more intimate because the viewer's normal defenses are down due to the unexpected situation.

> Even the experience of daily life demonstrates that things we do not understand, intruding stimuli we cannot control, and phenomena we cannot conceive may be sources of fear, which sometimes takes the despairing form of anxiety. On the other hand, the attainment of orientation is obviously a source of pleasure. For to conceive mentally means to control and thus to regain security [7].

The example serves to illustrate a way in which the artist can direct the viewer in an unconsidered way and then, unexpectedly, show them another way of looking at what was once taken for granted. The element of surprise is contained in the element of motion. The motion is the catalyst which awakens the viewer to a different, unexpected and not always welcomed reality.

> Sometimes an image can place its spectator under serious accusation. A person who only looks for what he wants in painting will never find that

> which transcends his preferences. But, if one has been trapped by the mystery of an image which refuses all explanation, a moment of panic will sometimes occur. These moments of panic are what count for Magritte. For him they are privileged moments, because they transcend mediocrity [4].

Another type of motion can totally change the way a person looks at the forest. The safe familiar setting can be destroyed by having leaves falling, not down from the trees, but upward from the ground. The unfamiliar upward motion causes the viewer to question other elements in the image previously taken for granted. The motion cannot be just the reverse pattern of a leaf falling down from a tree. The leaves must move as if some force like gravity is pulling them upwards. Otherwise the viewer can say that the animation is being run backwards, thereby finding a logical reason to keep their belief systems intact.

There are other types of feelings which can be aroused through the motion, especially with cyclic motion. Using a recursive loop produces rhythms which can key into many psychological implications.

As previously stated, rhythm is a certain ordering or pattern based ~~on cycles of an~~ appearance and its recurrence after a certain temporal interval. Rhythm is a

part of our everyday life. It can be heard in music, seen in dance, felt throughout our bodies as it carries out the processes of life.

> Rhythm may be viewed as an aspect of most if not all processes and occurrences in the internal and external worlds. Indeed, this conclusion should evoke but little surprise, for rhythm is a phenomenon of time-the dimension which is inseparable from all processes and being [7].

The are various opinions concerning the appeal attributed to rhythm. One theory links the appeal of rhythm to the rhythms of sexuality.

> Freud (1961, p.160) and his followers (L. Kaplaln, 1930, chap. 14) suggested that the pleasure of rhythm and or rhythmical activities in general derives from the connection of any rhythm with the rhythms of sexuality. This connection is based either on an associative linking or on low-grade sublimation. In this manner, the pleasure accompanying sexual activities is transposed, through perhaps with less intensity, to any other rhythmical activity, while rhythm acts as a link between the two otherwise non-related spheres of action [7].

Sexuality is one aspect of the life process. It is one of the most pleasurable of all experiences. But there are other internal experiences to rhythm related to rhythm. In the embryonic stage of development, we are surrounded by the incessant internal rhythmic sounds of

the womb. The gestation and early growth of our body is formed under the constant rhythmic sounds of our mother's heartbeat. Internally, our existence is based on rhythm. The breathing process and the beating of the heart are two of the most important functions of our bodies but yet they function automatically without the effort of thought. One associates external rhythms with the rhythms of our internal life supporting processes.

> It is a well-known fact that the perception of rhythm is invariably accompanied by actual movements or kinesthetic motoric impulses in line with the rhythm (Fraisse et al., 1953; Mursell, 1937; Ruckmick, 1913). Motoric activities, however, affect the pace of internal processes. Hence, the speed of external rhythm may be expected to alter the rate of interval processes. (Fraisse, 1967, p. 32 ff.) [7].

Besides the rhythms based on purely physical effects, rhythm can fulfill psychological needs. People impose rhythms on their lives; the time of eating, the time of sleep, the time for entertainment form the overt rhythms of their daily lives. These rhythms allow one to recognize structure which is used as a means of orientation. Rhythm establishes patterns which one views as a form of security. One can anticipate what will be happening next, but when there is a break in the rhythm it

is a signal that something has been altered. A re-evaluation of the situation must take place in order to regain orientation.

> The perception of gestalts plays an important role in the life of organisms, for gestalts introduce order, organization, meaningfulness, economy, and simplicity into the external and internal environments...as an aid in orientation it is an indispensable means of survival [7].

There is no one explanation for the pleasurable effects of rhythm. Yet each theory has similar complimentary structural elements and are by no means mutually exclusive.

> Sexuality is but one instance from the overall complex of vital life processes, and orientation draws its importance form its functions in making possible the satisfaction of life supporting needs in general and of sexuality as a particular instance. Rhythm is then pleasure-laden as a result of its multideterminative relations to many and various functions of the human being, which lends it not only the power to arouse tension and provide relief but also to fascinate, bind, and in certain cases dominate the perceiver [7].

Through association with past experiences one can derive certain feelings from rhythm. The rate of speed plays an important role in the psychological implications of rhythm. There is a certain range that corresponds to

life processes which are automatically associated with the pleasurable. Other rhythms, either too fast or too slow, are not as readily pleasurable.

> These observations might explain why rhythms which deviate markedly in speed from the range of tempo characteristic of standard life processes evoke tension in the perceiver, and why relief attends the return of tempo to the standard range [7].

How can the Motion-Still artist use this tool as an means for expression? The artist can create a disturbing or pleasant Motion-Still by exploiting the psychological implications of rhythm. Using a fast drastic rhythm can cause tension in the viewer, while a soothing or calming rhythm can make an unfamiliar surrounding less threatening or even pleasant. By using rhythm the artist can interact with the viewer in a much more personal way than with painting or sculpture. The use of rhythm allows the artist to engage the viewer's internal processes, making the image uniquely personal. Viewers become aware of their personal internal rhythms and the way they relate with the rhythms of the image. However, the artist must be aware that mere repetition can cause monotony, especially if the artist uses a slow rhythm as design element. A slow rhythm can slow the viewer's internal

rhythms, possibly causing drowsiness or just plain boredom.

> We may first observe that, while repetitive stimulation often brings on sleep, there are times when it does not. Whether it brings on sleep seems to depend on its arousal value, especially its intensity...A mother may quiet a disturbed infant by stroking his forehead or patting his back gently, but rhythmically prodding him in the eye would not work so well [1].

Still, not all rhythms must be aggressive or obtrusive to be a successful motion element in the Motion-Still. There is nothing wrong with using a monotonous rhythm, when needed. In fact, many times passive rhythms can be desirable, but once established any change in tempo may be feared or resisted [7].

The way in which the artist uses rhythm depends on the overriding concept of the work. Any rhythm can be considered successful if it is used aesthetically and it is well integrated into the work as a whole. The artist must command a certain knowledge of rhythms and their effects on the viewer. By understanding the variety of responses invoked by rhythms, the artist can use rhythm creatively and expressively.

A broad outline of the conceptual properties has been presented. The union of the conceptual components such as: the concerns over narration, the development and destruction of expectations, the use of conceptual conflicts, and the psychological implications of rhythm, must be taken into consideration when creating a Motion-Still.

With a better understanding of the two properties inherent in a Motion-Still (the physical appearance and the conceptual content) one should now consider the final factors in the presentation of Single-Frame Cinema.

CHAPTER 4

Presentation of the Art Form

In order to appreciate any art form, the work must be placed in the proper environment. The environment should provide the viewer with the opportunity to more fully experience the subtleties of an individual piece. For example, sculpture is influenced by the manner in which it is displayed. A mobile by Calder, a soft sculpture by Oldenberg, or a sculpture by Michelangelo may not be successful if exhibited in an inappropriate context. Different objet d'art require different approaches and resolutions to provide an appropriate context in which to experience the piece. To find the most successful form of presenting Motion-Stills, one can draw from other art forms which share characteristics of Single-Frame Cinema. The primary art forms that will be drawn upon are those of cinema and photography.

Motion-Stills have characteristics that are derived from both cinema and photography. The most common form of film presentation occurs within a movie theater. The primary characteristics of a movie theater have been

designed to best suit the medium of film. Movie-goers are seated in a large room. The seats are all facing a large screen. During the performance the room is dark directing attention towards the screen, and reducing any visual distractions. Silence is expected of the audience to avoid auditorily distracting other viewers. The viewer will be seated for approximately two hours so the seats have been designed with comfort in mind. The image is projected in front of the viewers on a large screen for ease of viewing and to visually envelope the viewer. These characteristics have been incorporated to facilitate the viewing of the cinematic art form.

In comparison, the requirements for an exhibition of photography is quite different. A traditional exhibition would take place in a large, well-lit room to aid the viewing process. There can be many individual photographs on display. The photographic image can vary in size from a few inches to many feet depending on the artist's design of the work. Unlike a film presentation, a photographic exhibition allows the viewers more control over the way in which they experience the art form. There are no seats in front of the image from which to view. There is no established viewing time limit; viewers can choose the

length of time that they view a select image. In summary, the way in which one views a photographic exhibition is much more active than the standard cinema experience.

Single-Frame Cinema is the union of the two media, cinema and photography, and as such it demands new viewing solutions. Single-Frame cinema exhibits unique aspects of the digital image that should be taken under consideration when designing its presentation. For the computer artist, the monitor is the actual canvas on which the art is created. Many delicate decisions are made using the monitor as the only form of visual interactive feedback. The monitor is a canvas composed of light. The computer artist learns to deal with light as a form of pigmentation. Dealing with subtractive qualities of light is different from dealing with the additive qualities of paint. As in a rainbow, the computer monitor uses various degrees of red, green, and blue (rgb) to define all colors. White is achieved by blending these three primary colors. Different colors are achieved by subtracting one or more of these three hues. Because the image on the monitor is produced by light, the lumninescent character of the image is lost when the image is turned into hardcopy. Light from a monitor is not a reflected light,

as in photography, nor is it light that is filtered through dyes and reflected off of a screen as in the case of film.

A Motion-Still exhibition would require special considerations for proper presentation. The image must be displayed on a monitor screen. Since the image does not require ambient light (or lack thereof) to be viewed, surrounding light should be kept low to reduce glare and reflection off the monitor screen. Only the screen of the monitor should be visible. The hardware should be hidden emphasizing not the technology but the artistic images themselves. The relatively small size of the monitor requires an intimate viewing relationship. The way in which the viewer experiences the work: re-viewing, distance, and length of viewing, must be left open to the individual.

Animation as used in a Motion-Still makes it a temporal art form, and it cannot be expressed in static terms. Therefore viewers need time to experience the art of motion. Limited seating should be provided for comfort in front of each image for longer viewing of the Motion-Still. However, traditional seating should be avoided. The presence of a traditional chair arrangement would

invoke preconceived cinematic notions that one must sit down and be quiet. Seating should be casual, possibly multi-leveled cube-like units, invoking a nontraditional atmosphere. As in a photographic exhibition, Single-Frame Cinema can display a variety of images at one showing. With these considerations in mind, the viewing space needs to be large so that each Motion-Still has room to be viewed without undue distraction from the other moving images on display. The arrangement should allow the viewers to walk around the exhibit and take in each work as if isolated in its own environment. Using this proposed arrangement in an exhibition of Motion-Stills, pre-conceived viewing expectations can be kept to a minimum, allowing the viewer to be more open to the new art form of Single-Frame Cinema.

As indicated before, the element of sound can be considered when creating a Motion-Still. The relationship of the sound to the image should mirror the relationship of the motion to the stillness. The sound should supplement the qualities of the image; it should not overpower or distract from the image. This element of sound may consist of music, environmental sounds, voices; anything that the artist feels will suits the concept.

Keeping in mind the non-narrative qualities of a Motion-Still, the element of sound should not imply narration.

Further study should be done before one incorporates the element of sound into a Motion-Still. This paper acknowledges the fact that sound may be an integral part of a work of art, but the primary concern here is directed towards examining the visual elements of Single-Frame Cinema.

Once the image has been created on the computer monitor, the artist usually transfers the image to another medium for presentation. The most often used means of transferal is film or videotape. But there are problems with this practice. As with any form of reproduction, the quality can be degraded. A painter does not take a photograph of a painting, stow away the original painting, and try to profess that the photograph is the actual work of art. This raises an interesting question: Is there such a thing as an 'art object' in digital imagery? If so, where is the piece of art? Is it the reproduced image, or the digital information in the computer? If it is the image itself, then the reproduced image must represent the original piece of art as closely as possible; for that reproduction is the art object. Or

could it be that the digital image is only a vehicle to convey ideas, reducing the surface appearance of the final artwork to something less than a primary concern?

Taking all the questions into consideration, what is the most desirable medium for the presentation of a Motion-Still? The medium selected must fulfill the following criteria: the presentation must reproduce the art work as close to its original appearance as possible; the medium must be able to display real-time animation; it must be able to accommodate and cycle through a variety of animation lengths. Is such a medium available?

As a medium for presenting Motion-Stills, the future of the Compact Disc (CD) holds the greatest promise. The CD signal utilizes the same digital format used by computers. There are no conversions or translations needed to store a digital image on CDs, therefore there is no loss of image quality. The computer image can be stored in its original digital form. The digital information is then displayed on a monitor, similar to the one used by the artist to create the work. This digital compatibility between CDs and computers allows for easy retrieval and processing of images. Full motion color video on a Compact Disc is not available at present. For

now, a CD delivers a continuous stream of 60k video frames at a maximum rate of 2 or 3 frames per second. Through the use of specialized software for digital video processing, soon, full color motion video on CD's will be seen. With such equipment, it will no longer be necessary to store every bit of data for each successive frame, only the pertinent changes from one frame to the next. This type of video compression reduces the amount of storage required for video playback. One company doing research in digital video compression, has already demonstrated the capabilities of storing up to two hours of digital video on one CD, utilizing direct memory access to a microcomputer processor [3]. Since the element of motion is relatively small in Motion-Stills, space available for storage on CDs should increase significantly.

More research and development is necessary for CD digital video to become a viable consumer reality. This is a direction for the future. However, the present technology affords immediate possibilities.

Today's option for full real-time motion video is the Videodisc. The Videodisc is closely related to the CD in many ways. CDs and Videodisc are both multimedia laser optical discs.

> Both share many features that make optical discs so appealing--durability, rapid random access to high-quality information, and high data density, to name a few. In fact, both technologies are so similar, that at least one player on the market can play both consumer compact discs (audio) and videodiscs [8].

Todays Videodisc can store either 30 or 60 minutes of real-time video per side. A CD can store about 9000 images whereas the Videodisc can store approximately 54,000 frames of video.

The biggest difference is found in the way the video information is recorded. Videodiscs use an analog signal to store information rather than the digital format used by CDs. Combining the Videodisc analog signal with the computer digital output creates complications.

> Sadly, any method of converting an image to a discrete form can cause undesirable changes in the image. Such changes are known as 'quantization effects' and have been studied extensively, since they occur whenever an analog signal is converted to digital form. The quantization effects are discussed in terms of three broad subject areas: resolution, pixel geometry, and scaling [11].

Although the appearance of the Motion-Still is of primary concern, the benefits of todays Videodisc far outweigh the possible "undesirable changes" that might

occur in the transfer of information. The Videodisc, more than any other technology available at present satisfies the variety of specialized needs entailed by the art of Single-Frame Cinema.

Other existing forms of presentation can be used when creating Motion-Stills. While not as high quality as the completely digital image, these solutions can open doors and minds to Motion-Stills as an art form.

One could film directly off of a monitor and play back the image through the use of an endless film loop (rear projection would be preferred). The Motion-Still could be recorded directly to a video recorder connected to the computer. The video tape could then be shown on standard television monitors and the Motion-Still could be repeated to create the cyclic motion. The employment of these existing technologies, would allow artists to create Motion-Stills now.

CHAPTER 5

Contrast and Comparison

Some examples of existing artwork exemplify some aspects of Single-Frame Cinema without completely fulfilling all the criteria for this art form. Specific points concerning Motion-Stills can be made more comprehensible through the contrast and comparison of selected works. It is beneficial to address these works as visual guidelines to help clarify and further distinguish the properties of Motion-Stills. Each of these artworks used for illustrative purposes were created for a variety of reasons and are successful in their own right. As such they cannot be transformed into Motion-Stills by merely altering their presentation. Each work would have to be re-evaluated and reworked in order to maintain the integrity of the original piece. This is not to say that Motion-Stills are the desired form of these pieces, only that the format of Motion-Stills might provide an optional expressive outlet. Though much could be written about the differences and similarities between these works and Motion-Stills, only the major differences or similarities will be highlighted.

The piece entitled "Bouncing Spheres" produced at Cranston/Csuri Productions (plate 8), provides a good starting point for comparison. In this piece of animation, large spheres bounce on a flat plane below. The plane consists of pencils circling around a center point. A smaller transparent sphere in the foreground bounces upon

Plate 8.
"Bouncing Spheres"
produced by Cranston/Csuri Productions (1983).

the implied plane while the larger reflective sphere drops below the defined plane. The image of the rotating pencils can be seen in the reflection of the large sphere while the smaller sphere refracts the events behind it.

The first property shared by Motion-Stills and "Bouncing Spheres" is that they are both computer generated images. They utilize cyclic (patterned non-event-oriented) motion and neither attempt narration. The similarities between the two stop here. Visually, "Bouncing Spheres" incorporates too much motion to be an effective Motion-Still. Practically all the elements move in one form or another. There exists no space for the contrasting still element. Without the still element, the image is viewed as traditional animation. The lack of the Still element leads directly to the lack of conceptual conflict inherent in a Motion-Still. The fact that one sphere bounces upon the plane while the other sphere passes through the plane, does not fulfill the requirement of conceptual conflict. The creation of conceptual conflict in a Motion-Still arises from the conceptual juxtaposition of the moving element with the still element. This visual juxtaposition is the catalyst which causes the conceptual incongruities.

The Siggraph '85 Electronic Film Show presented an animation entitled "Blowing in the Wind" (plate 9), produced by Lucasfilm Ltd. This computer generated animation depicts a field of tall grass blowing in the wind. The non-narrative animation served as a demonstration of realism in digital imagery. The

Plate 9.
Scene from "Blowing in the Wind"
by Lucasfilm Ltd. (1985).

animation used non-event-oriented random .motion for the basis of its recursive loop. The cyclic motion of the grass, like the cyclic motion of the "Bouncing Spheres", is successful in perpetuating the essence of the "endless moment". The motion itself was subtle. The still element is a clear blue sky. The grass, though composed of many individual blades, is treated as the singular moving object. Visually, this animation coincides closely with the appearance of a Motion-Still. Conceptually; however, it falls short. The motion element and the static element are balanced but they are not manipulated in a way which makes the viewer re-evaluate the world. The two major contrasting elements have little, if any, interaction. "Blowing in the Wind" is a successful attempt to imitate and duplicate the qualities of nature. But as stated earlier, merely showing what already exists does not enlighten the viewer. The artist does not show anything new by showing redundant information. There is no need to re-evaluate existing belief systems if a unusual conflict does not exist. Motion-Stills juxtapose the still with the motion to create unexpected relationships; making the viewer experience stillness and movement in untraditional ways. Although "Blowing in the Wind" has artistic qualities, it primarily examplifies digital realism, not

expressive art.

Francis Ford Coppola's film, "Koyaanisqatsi" serves as an excellent source of conceptual juxtaposition. As the earlier comparisons related more towards the visual properties of Motion-Stills, "Koyaanisqatsi" illuminates the conceptual realm. The film itself is a visual interpretation of the Hopi Indian term, Koyaanisqatsi, meaning unrelated events or phenomena. The first image is a slow motion explosion. The next footage is a rocket blasting off into space, also in slow motion. As the film progresses, one is shown aerial scenes of landscapes unaltered by mankind. The pace quickens. The camera is focused on capturing natural phenomena; such as the formations of clouds, the crashing of waves, the rising of the mist from a waterfall. Soon the element of human intervention enters the picture. One now sees man-made structures in the environment. The film then directs it's attention toward the human factor. More emphasis is placed upon man and the environment in which he lives. There are many scenes of city-scapes, deserted slums, and traffic patterns. Much attention is place on the emergence of machinery and it's relationship to mankind. The scenes that are particularly effective are those which

deal with the fast food industry: such as, a visit to a Twinkie factory. The images are often played back in slow-motion or at a fast rate of speed. The pace of cutting from scene to scene is escalated. Images change so fast that they blur into one another. This pace stops suddenly, giving way to aerial footage, this time not of nature, but of a city. The patterned image of the city fades into the patterned designs on a computer circuit board. The final scene of "Koyaanisqatsi" is again the lift-off of a rocket. The camera follows the rocket's accent until it unexpectedly explodes. A falling fragment of the rocket is the last image of the film.

Part of the success of this film relies on the creativity of the director in presenting familiar phenomena in an unfamiliar way. The viewer is forced to look at common events or phenomena with much more awareness. For example, traffic is not an alien subject matter to most viewers of the film, but when the subject is treated in an unusual way (such as time-lapsed photography) one's perception of the phenomena seems almost foreign. Certain characteristics or idiosyncrasies are undetectable through normal time viewing. The director provides a new way of looking at the world,

increasing awareness of the phenomena itself, thus facilitating the learning experience.

"Koyaanisqatsi" is a valuable resource for the potential Motion-Still artist. Numerous examples of temporal incongruities exist. The use of time-lapsed and slow-motion photography is the means by which the director forces the viewer to re-evaluate existing thought patterns. Ideally the Motion-Still artist will also force the viewer to re-examine preconceived concepts of realities, not by means of special effect photography as in "Koyaanisqatsi", but by the intelligent juxtaposition of movement and the static in a Motion-Still.

The comparisons we have dealt so far have been individual works. There exists however, a class of cinema which deals very closely with the ideals and imagery of Motion-Stills. This class is referred to as Synaesthetic Cinema. In the book, "Expanded Cinema" by Gene Youngblood, synaesthesis is defined as "the harmony of different or opposing impulses produced by a work of art...the simultaneous perception of harmonic opposites." The opposing impulses or dualism can be seen in the form of harmonic opposites: yes/no, on/off, movement/stillness. Youngblood describes synaesthetic cinema as "an art of

relations" [12]. The ambiguity of the classification is recognized even by it's author. Youngblood states, "There's no single film that could be called typical of the new cinema because it is defined anew by each individual filmmaker.". Films, such as, Will Hindle's "Chinese Firedrill", Michael Snow's "Wavelength", Andy Warhol's "Blue Movie", and Stan Brakhage's "Dog Star Man" are not archetypical examples and illuminate various points of synaesthetic cinema. A few specific elements are addressed in these films. On these points, relationships can be drawn between Synaesthetic cinema and Motion-Stills.

Synaesthetic cinema, like Motion-Stills are non-narrative, although the context of the images may suggest a 'narrative' line.

The concept of 'harmonic opposites' as a means to an end, is strongly rooted in the essence of both artistic expressions.

> Synaesthetic cinema, whose very structure is paradox, makes paradox a language in itself, discovering the order (legend) hidden within it [12].

By presenting new realities through paradox, one must adjust by creating a new kind of consciousness. This consciousness is directly effected by the techniques of the expression. The technique of continual image transformation (so heavily employed in synaesthetic cinema) directly corresponds to the rhythmical design element in Motion-Stills. After all, the constant image transformations of synaesthetic cinema creates a rhythm in and of itself. These psychological implications created by the use of these rhythms are incorporated into the new consciousness that Freud spoke of as 'oceanic consciousness'.

> The oceanic effect of synaesthetic cinema is similar to the mystical allure of the natural elements: we stare in mindless wonder at the ocean...drawn almost hypnotically to fire...see cathedrals in clouds, not thinking anything in particular but feeling somehow secure and content [12].

The natural elements, given as examples in the above quote, have in common the visual effects of rhythm and patterning. Although the randomness will occur, the basis for the motion or change is rhythmic. The same oceanic consciousness can be induced by the use of rhythm within a single image not as easily as with the rhythm of multi-

imaged synaesthetic cinema.

Motion-Stills and Synaesthetic cinema view time in a similar manner. The passing of time is subsumed in synaesthetic cinema: time is of the present; there is no past and no future. Motion-Stills likewise have a sense of temporal continuum, manifested as an 'endless moment'.

One point of difference, alluded to earlier, is the technique of transformation which creates the work's internal rhythm. For Youngblood:

> A synaesthetic film is, in effect, one image continually transforming into other images: metamorphosis. This is the one unifying force in all of synaesthetic cinema [12].

Unlike a synaesthetic film which deals with different images in metamorphosis, Motion-Stills address the changes within a single image. A Motion-Still image is one which relies on the static element as the unifying constant. This is an important element to remember. (The overall static quality of the image will prevent Motion-Stills from entering the realm of cinema.) The actual transformations of images into other images create the element of paradox used by synaesthetic cinema. For Motion-Stills, the element of paradox must be incorporated

in the single image. Even Youngblood himself states that the conflict-juxtaposition of intellectual effects is increased when they occur within the same image.

Multi-images are inherent in cinema, but by looking at a new form of presentation, single-image cinema may arise. In the mid-sixties, when the exploration of synaesthetic cinema was at its pinnacle, the possibility of using a computer and computer monitor for presentation of artwork may not have been considered. If this option had been available, instead of continual image transformation, more interest may have been placed on movement in the single image and the possibilities of internal paradox.

There exists a great deal in common between Motion-Stills and Synaesthetic cinema. The only major difference depends single-image/multi-image vehicle for the expression of paradox. This difference depends directly on the medium for which the art was created. Motion-Stills may be viewed as the digital single-image extension of the multi-imaged synaesthetic cinematic experience.

CHAPTER 6

Summary

With the rise of computer generated imagery as an viable art form, new possibilities for artistic expression arise. The potential inherent in the computer art form makes possible imagery inconceivable in more traditional media. The artist is not hindered by the physics of the real world; the potentials are as free as the artist's imagination. The artist must now exploit the computer's unique characteristics and abilities. New art forms can arise from this electronic exploitation. The term "Single-Frame Cinema" describes one such art form. This area of artistic expression lies between the still images of photography and the primarily kinetic images of cinematography. Single-Frame Cinema takes the temporal polarities of photography and cinema, and unites them into a single visual vignette of time. Each individual vignette is referred to as a "Motion-Still".

Because art goes beyond the mere task of imitation, Single-Frame cinema does not mimic either photography or cinema, but synthesizes them into a new form of artistic

expression. Single-Frame Cinema is this category of computer imagery which focuses on the visual balance and the conceptual implications of the juxtapositon between motion (cinema) and stillness (photography) through the recursive looping of minimal animation.

As with most art forms, there are criteria which distinguish it from other forms of expression. In the case of Single-Frame Cinema, the Motion-Still imagery must exhibit certain physical and conceptual properties. The criteria for the visual properties address such topics as: establishing a successful still element, using one of the various types of cyclic motion, and the balancing of these elements. The criteria addressed by the conceptual properties include; the formation and destruction of expectations, the various forms of conceptual conflicts, and the psychological implications of rhythm. These criteria distinguish the imagery of Single-Frame Cinema from other related art forms.

This electronic art form requires a unique form of presentation. Because Motion-Still imagery is created on a light producing monitor, it should be displayed by the medium on which it was created. Through the use of technologies such as Compact Discs and Videodiscs, the

artist has the ability to display a high resolution computer generated animation in real-time, allowing for the creation of a more focused, intimate reality.

The most important aspect of this art form is that it provides an expressive alternative to the ancestral art forms of animation and photography. These established art forms seem insufficient to express the dynamic imagination of today's growing society. Computers are part of everyday life and are becoming more important in our personal lives. Art reflects the concerns and ideals of society, and since the computer is such an integral part of today's society, the computer must enter the realm of the artistic. Single-Frame cinema will provide a means to express unprecedented imagery, reflecting today's unprecedented concerns.

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